

CLAIMS

1. A negative active material for a rechargeable lithium battery comprising crystalline carbon having a dispersed element serving as graphitization catalyst therein.

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2. The negative active material of claim 1, wherein said element serving as graphitization catalyst is at least one material selected from the group consisting of transition metals, alkaline metals, alkaline earth metals, semi-metals of Group 3A, Group 3B, Group 4A and Group 4B of the Periodic Table, elements of Group 5A, and elements of Group 5B.

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3. The negative active material of claim 2, wherein said transition metal is at least one selected from the group consisting of Mn, Ni, Fe, Cr, Co, Cu, Mo and W; said alkali metal is at least one selected from the group consisting of Na and K; said alkali earth metal is at least one selected from the group consisting of Ca and Mg; said semi-metal is at least one selected from the group consisting of the semi-metal of Group 3A selected from the group consisting of Sc, Y, lanthanoids and actinoids, the semi-metal of Group 3B selected from the group consisting of B, Al and Ga, the semi-metal of Group 4A selected from the group consisting of Ti and Zr, and the semi-metal of Group 4B selected from the group consisting of Si, Ge and Sn; said elements of Group 5A is at least one selected from the group consisting of V, Nb and Ta; and said elements of Group 5B is at least one selected from the group consisting of P, Sb, and Bi.

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4. The negative active material of claim 1, wherein said element serving as graphitization catalyst is present in an amount of 0.01 to 22 wt% on the basis of the negative active material.

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5. The negative active material of claim 1, wherein said negative active material comprises 0.01 to 12 wt% of B and 0.01 to 10 wt% of one or more elements selected from the group consisting of transition metals, alkali metals, alkali earth metals, semi-metals of Group 3A, semi-

metals of Group 3B, semi-metals of Group 4A, semi-metals of Group 4B, elements of Group 5A, and elements of Group 5B, said transition metals being selected from the group consisting of Mn, Ni, Fe, Cr, Co, Cu, Mo and W; said alkali metals being selected from the group consisting of Na and K; said alkali earth metal being selected from the group consisting of Ca and Mg; said semi-metal of Group 3A being selected from the group consisting of Sc, Y, lanthanoids and actinoids; said semi-metal of Group 3B being selected from the group consisting of Al and Ga, said semi-metal of Group 4A being selected from the group consisting of Ti and Zr; said semi-metal of Group 4B being selected from the group consisting of Si, Ge and Sn; said element of Group 5A being selected from the group consisting of V, Nb and Ta; and said element of Group 5B being selected from the group consisting of P, Sb and Bi.

6. The negative active material of claim 1, wherein an intensity ratio $I(110)/I(002)$ of said negative active material is less than or equal to 0.04, said intensity ratio $I(110)/I(002)$ being defined as an X-ray diffraction peak intensity $I(110)$ at a (110) plane to an X-ray diffraction peak intensity $I(002)$ at a (002) plane.

7. A method of preparing a negative active material for a rechargeable lithium battery comprising:

mixing an element serving as graphitization catalyst with a carbon precursor;
coking the mixture by heat-treating at 300 to 600 °C to form cokes;
carbonizing the cokes to form a carbide; and
graphitizing the carbide at 2800 to 3000 °C .

8. The method of claim 7, wherein said element serving as graphitization catalyst is at least one material selected from the group consisting of transition metals, alkaline metals, alkaline earth metals, semi-metals of Group 3A, Group 3B, Group 4A and Group 4B of the Periodic Table, elements of Group 5A, and elements of Group 5B.

9. The method of claim 8, wherein said transition metal is at least one selected from the group consisting of Mn, Ni, Fe, Cr, Co, Cu, Mo and W; said alkali metal is at least one selected from the group consisting of Na and K; said alkali earth metal is at least one selected from the group consisting of Ca and Mg; said semi-metal is at least one selected from the group consisting of the semi-metal of Group 3A selected from the group consisting of Sc, Y, lanthanoids and actinoids, the semi-metal of Group 3B selected from the group consisting of B, Al and Ga, the semi-metal of Group 4A selected from the group consisting of Ti and Zr, and the semi-metal of Group 4B selected from the group consisting of Si, Ge and Sn; said elements of Group 5A is at least one selected from the group consisting of V, Nb and Ta; and said elements of Group 5B is at least one selected from the group consisting of P, Sb, and Bi.

10. The method of claim 9, wherein said element serving as graphitization catalyst comprises B and at least one element selected from the group consisting of transition metals, alkali metals, alkali earth metals, semi-metals of Group 3A, semi-metals of Group 3B, semi-metals of Group 4A, semi-metals of Group 4B, elements of Group 5A, and elements of Group 5B, said transition metals being selected from the group consisting of Mn, Ni, Fe, Cr, Co, Cu, Mo and W; said alkali metals being selected from the group consisting of Na and K; said alkali earth metals being selected from the group consisting of Ca and Mg; said semi-metal of Group 3A being selected from the group consisting of Sc, Y, lanthanoids and actinoids; said semi-metal of Group 3B being selected from the group consisting of Al and Ga, said semi-metal of Group 4A being selected from the group consisting of Ti and Zr; said semi-metal of Group 4B being selected from the group consisting of Si, Ge and Sn; said element of Group 5A being selected from the group consisting of V, Nb and Ta; and said element of Group 5B being selected from the group consisting of P, Sb, and Bi.

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11. The method of claim 7, wherein said element serving as graphitization catalyst is added in an amount of 0.01 to 22 wt% on the basis of carbon precursor.